



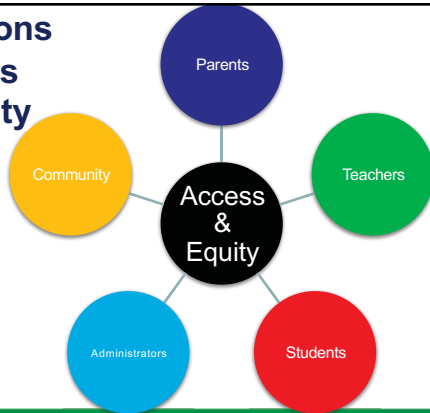
Which describes your belief?

- Mathematics for all
- Mathematics for all.
- Mathematics for “all”
- Mathematics for all?
- Mathematics for all!
- Mathematics for all 😊

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Perceptions of Access and Equity



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What teachers believe is important influences the decision that they make about **what** content to teach, **how** to teach it, and, in many cases, **who** should receive the content.


Aguirre, Mayfield-Ingram & Martin, 2013

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Identity

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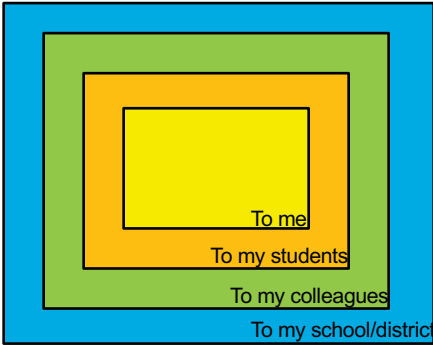
What is identity?


The ways that people come to conceptualize themselves and others and how they act as a result of those understandings.

Cornell and Hartmann, 1998

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Who Am I?



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What's Your Identity?

- Take a moment to think about how you identified yourself.
- What descriptors did you use?
- What is your identity as a math learner?

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Mathematics Identity

- beliefs about one's self as a mathematics learner,
- one's perceptions of how others perceive them as a mathematics learner,
- beliefs about the nature of mathematics,
- engagement in mathematics, and
- perception of self as a potential participant in mathematics.

Solomon, 2009

Think about you as student in your classroom.

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Mathematics Identity

The dispositions and deeply held beliefs that students develop about their ability to participate and perform effectively in mathematical contexts and to use mathematics in powerful ways across the contexts of their lives.

Aguirre, Mayfield-Ingram & Martin, 2013



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The nature of mathematics learning experiences that a teacher had in his or her own schooling has a powerful influence on the mathematics teacher identity that he or she develops.

Aguirre, Mayfield-Ingram & Martin, 2013



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It is important for teachers to understand the impact of the instructional decisions that they make, and the social and academic norms that they create, on a child's mathematics identity.

Aguirre, Mayfield-Ingram, Martin, 2013

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Reflect

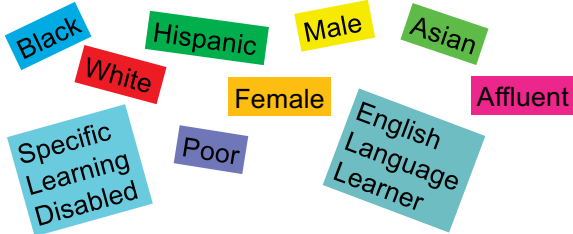


- Who are our students?
- Are they equally smart?
- What keeps us (and them) from seeing how smart they are?
- Should we teach them all the same way?


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What does it mean to be a learner and doer of mathematics in the context of being?




What is your identifier?


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Reflect




- Where do these words, phrases, images, stereotypes come from?
- How might they be consequential in the lives of students?
- How might they be consequential in the context of teaching and professional practice?

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Calvin's Story

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Interwoven Identities

- Am I not being recommended for placement in pre-algebra course because I am no longer a good student who is good at mathematics?
- Am I not being recommended because I am perceived as a behavioral problem?
- Am I not being recommended because middle school is different from elementary?
- Am I not being recommended for placement in pre-algebra course because I am a Black boy?

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Even labels we think of as positive can hurt students.

Labeling frames how we think about kids in very subtle ways.

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Identity Affirming or Identity Challenging

Identity-affirming behaviors influence the ways in which students participate in mathematics and how they see themselves as doers of mathematics.

We see identity-affirming criteria emerging as learners are labeled as “smart,” “gifted,” “proficient,” “at-risk,” or “on grade-level”.

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Identity Affirming

We affirm mathematics identities by providing opportunities for students to make sense of and persevere in challenging mathematics.

- Facilitate meaningful mathematical discourse
- Support productive struggle in learning mathematics
- Elicit and use evidence of student thinking

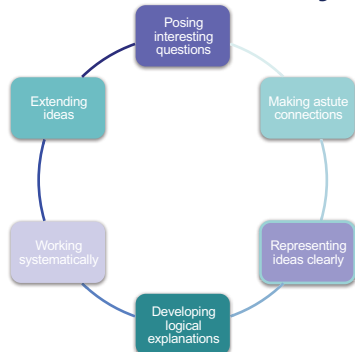
This kind of teaching cultivates and affirms mathematical participation and behaviors.

NCTM, 2014

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Status vs. Ability



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Identity & Motivation

- Understanding the strengths and motivations that serve to develop students' identities should be embedded in the daily work of teachers.
- Mathematics teaching involves not only helping students develop mathematical skills but also empowering students to seeing themselves as being doers of mathematics.

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A focus on learning rather than on labeling is critical. Finding ways to build on resilience, rather than focus solely on conditions that make resilience necessary should be primary goals for teachers.

Aguirre, Mayfield-Ingram & Martin, 2013

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What are your beliefs?

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How does your identity influence your beliefs?




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Sort the Beliefs

Productive Beliefs

Unproductive Beliefs






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Table Talk


What does it mean for students if teachers and/or administrators ascribe to the unproductive beliefs?

How do we move from unproductive to productive beliefs?



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<u>Arguments for Inequity</u>	<u>Arguments for Equity</u>
<ul style="list-style-type: none"> If we spend money in one place, we don't have it to spend elsewhere. If my child is forced to collaborate with poor students, he or she will be pulled down academically. Changing paradigms is difficult, especially when it involves changing attitudes about race and resources! 	<ul style="list-style-type: none"> It's the right thing to do. The most advantage and successful students do even better in an equitable school setting. Financial support for schools may actually increase. Parental, staff, and community support grows. The alternative to equity is catastrophic.

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Unfounded Predictions Are Inequitable

Equity means...

“being unable to predict students’ mathematics achievement and participation based solely upon characteristics such as race, class, ethnicity, sex, beliefs, and proficiency in the dominant language”

Gutiérrez, 2007, p. 41

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Superficial Reasoning

When teachers inherit a class of students who struggle with mathematics or have been identified as low achievers, too often they assume that procedural, low-level remediation is most appropriate

Aguirre, Mayfield-Ingram & Martin, 2013

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Deficit Views of Mathematical Learning

Undermines Growth Mindset

- “You’re a natural! I love that.”
- “Well, at least you tried!”
- “Great Job! You’re so talented!”
- “This is hard, Don’t feel bad if you can’t do it.”
- “Maybe this just isn’t your strength. Don’t worry—you have other things to contribute.”

Promotes Growth Mindset

- “You’re a learner! I love that.”
- “That didn’t work. Let’s talk about how you approached it and what might work better.”
- “Great job! What’s one thing that could have been even better?”
- “This is hard. Don’t feel bad if you can’t do it yet.”
- “I have high standards. I’m holding you to them because I know we can reach them together.”

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Overcoming Obstacles

Educators need to identify, acknowledge, and discuss the mindsets and beliefs that they have about students' abilities.

- Fixed Mindset: Believe that you are either smart or you are not
- Growth Mindset: Intelligence and “smartness” can be learned and that the brain can grow from exercise

Dweck, 2006

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Access and Equity

An excellent mathematics program requires that all students have access to a **high quality mathematics curriculum, effective teaching and learning, high expectations, and the support and resources** needed to maximize their learning potential.

Principles to Actions, p. 59

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Equity Is Fairness

Equity does not mean that every student should receive identical instruction; instead, it demands that reasonable and appropriate accommodations be made as needed to promote access and attainment for all students.

Principles and Standards for School Mathematics, NCTM 2000, p. 12



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Access Supports Equity

The concept of equity includes “the equitable distribution of material and human resources, intellectually challenging curricula, educational experiences that build on students’ cultures, languages, home experiences, and identities; and pedagogies that prepare students to engage in critical thought and democratic participation in society”

Lipman, 2004, p. 3

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Equity Based Teaching Practices

- Going deep with mathematics
- Leveraging multiple mathematical competencies
- Affirming mathematics learners’ identities
- Challenging spaces of marginality
- Drawing on multiple resources of knowledge

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Reflect



In what ways do we withhold from some students the opportunity to engage in, think about, and discuss mathematics?

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Agency

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Sense of Agency

A high sense of agency is having a high degree of self-exploration that is associated with a high degree of self-direction in determining one's life course.


Côté & Schwartz, 2002

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High Sense of Agency

Students with a high sense of agency make decisions about their participation in mathematics.

- “I gotta excel in everything I do. Be the best that I can be...being the best means doing your work, asking questions, and being involved in class.” (Bilal)
- “Good math students are focused, do their work, and want to make A's all the time...I am a good math student.” (Andre)

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With Math I Can



<https://www.amazon.com/gp/withmathican>

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Overcoming Obstacles

- Access to rigorous, high-quality mathematics, taught by teachers who not only understand mathematics but also understand and appreciate learners' social and cultural contexts in meaningful ways.
- Classroom environments that foster a sense of community that allows students to express their mathematical ideas.

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Bus Pass Problem


It costs \$1.50 each way to ride the bus between home and work. A weekly bus pass is \$16. Which is the better deal, paying the daily fare or buying the weekly pass?



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
- Many students reasoned about and solved the problem in a way test designers did not anticipate.
- The assessment item was based on a particular set of assumptions.
- Many students solved the problem under a different set of assumptions based on their daily lives and social realities.

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Mathematical understanding is not disconnected from students' social realities. Students with different backgrounds and experiences draw on these to make sense of ideas and problem-solving situations.

Aguirre, Mayfield-Ingram & Martin, 2013

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
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Reflect



"We can never fully understand what (or how) inequitable beliefs and practices affect another person."

Cathy Seeley

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“Isn’t it time we started
acting how we say we
believe?”

Roberto Zamora

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What questions do
you have?



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